

Soil Transmitted Parasites in Fruits and Vegetables Planted in Landscape Management Nursery, College of Agriculture Sciences, Ebonyi State University, Abakaliki, Ebonyi State, Implication to Public Health

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Abstract

The parasitological examination of soil samples extracted from the roots of pre-nursery crops of fruits and vegetables for the prevalence of soil transmitted helminths was conducted using sedimentation and centrifugation techniques respectively. The study revealed that soil transmitted parasites were implicated in their full developmental stages of adult worms and eggs. These include *Capillaria*, *Strongyloides stercoralis*, *Trichuris trichuria*, Hookworms, and *Ascaris lumbricoides*. Their presence could be as a result of using animal dung/feaces, direct urination and open defecation on the nursery sites by students, staff, and others thus contaminating the nursery and posing health problems to students and farm workers in the campus. However, infected students could be treated with antihelminthics while avoidance of the use of animal dung/feaces and urination will reduce the parasite presence. Students infection, can be achieved through public health awareness scheme and provision of toilet facilities to the students and staff.

Keywords: Parasites, Soil, Fruits, Vegetables, EBSU.

Introduction

In Africa, more than half of the population does not have access to safe drinking water and about two-thirds lack good sanitary means of excreta disposal. Nigeria, like other developing countries is faced with the dilemma of inadequate disposal of excreta-related human waste discharged into the environment. Agbolade *et al*, (2008). Thus, in rural farming communities of Southeast Nigeria, promiscuous defecation on open fields and farm lands is still a common practice. CAS campus lack disposal facilities and their students engage on uncommon practice of indiscriminate disposal of excreta. Excreta related diseases especially helminths that cause gastrointestinal disturbances in man rank high on the scale of disease burden in mixed populace that lack portable drinking water and good sanitation. WHO (1989) reported that inadequate sanitation, lack of access to clean potable water and poor domestic hygiene are the cause of 80% of all infectious diseases in the world and responsible for 10-25 million deaths each year, most of them under 5 years age group.

These are transmitted through faecal-oral route through faecally contaminated water, food and soil. Communities characterised by poor hygiene and a large proportion of children will generate excreta rich in enteric pathogens Wargovich, (2000). Helminth infections are of particular concern in developing countries and many of these parasitic worms have human hosts. To highlight the actual risk to public health affecting student farmers as well as consumers of crops grown on faecally polluted soil as a result of post harvest contamination with helminths eggs, ova and adult worms were studied. The environment of this study provided conducive atmosphere for the prevalence of these soil transmitted helminths. Montessoro *et al*, (2003) also reported that moist soil and average temperature favours the fecundity of soil transmitted helminths and could suggest that this quickens their reproduction. This was carried out in farm produce from crop and landscape management nursery Ebonyi State University Abakaliki to highlight the actual implication to public health affecting student farmers as well as consumers of crops grown on focally polluted soil as a result of postharvest contamination with helminth adult worm eggs and larvae.

METHODS

Study Area

Ebonyi State geographically lies between coordinate 70 31' and 80 30' N and between 50 40', and 60 45' E. The climate of the area is tropical and the vegetation characteristic is predominantly the rain forest with an average atmospheric temperature of 250-350C. There are two distinct seasons, the rainy and the dry seasons; the former stretches between April and October, while the latter occurs from November to March. The study was conducted in CAS campus Ebonyi State University Abakaliki. The population here is made of student and staff farmers.

Sanitation facilities are either non-existent or grossly inadequate in this study area. Thus, defecation on open farm lands is a popular practice among students and staff due to lack of disposing facilities which ensures a predisposing factor to many parasitic diseases.

Methodology

1400 soil samples from farm lands were collected from College of Agriculture campus Ebonyi State University Abakaliki as well as fruits from student farmers were examined for helminths eggs, ova and adultworm using the zinc sulphate flotation technique and microscopy.

Result and Discussion

Samples of soils from farm lands and stool from pupils in some public and private schools in Izzi local government of Ebonyi state as well as fruits and vegetables bought directly from the local farmers were examined for helminth eggs and larvae using the zinc-sulphate floatation, centrifugation methods and microscopy respectively, to highlight the public health significant of using untreated human excreta to fertilize farm lands. All the fruits and vegetables were found to be contaminated. Proper sewage treatment remains a key issue in poor rural farming communities of developing countries.

Out of the 1,400 soil samples and 1000 fruits examined using zinc-sulphate flotation technique and microscopy, 58% and 42% respectively were positive. Eggs of *Ascaris lumbricoides* (15%); Hookworms (11.8%); *Capillaria* (4%) and larvae of *Strongyloides stercoralis* (1.2%) were recovered from soil. The samples contained *Ascaris lumbricoides* (30.4%); Hookworms (20%); *Capillaria* (9.6%) and *Strongyloides stercoralis* (1%) respectively. Mixed infections were also common. All the fruits were found to be contaminated with one or more species of helminthes adult worm, eggs, ova or larvae, with the fruits being more contaminated (52.9%) and (47.1%) respectively. *Solanum eathropicum* leaf recorded the highest contamination rate (23%) while *Telferia occidentalis* recorded the least contamination (8.3%). *Solanum eathropicum* and *Solanum melongina* fruits recorded the highest contamination rate (15%) while *Lycopesicum lycopesicum* recorded the least rate of contamination (5.6%) for the fruits. Helminth ova and larvae recorded were *Ascaris lumbricoide*, *Capillaria*, Hookworms, *Strongyloides stercoralis* with *Ascaris lumbricoides* being the most frequently encountered (60.3%). These parasites affect human and animals and are directly linked to faecal contamination (Simonart *et al*, 2003). The recovery of helminthic eggs and larvae on the vegetables and fruits is indeed of great public health importance. This shows that hygienic status of the consumers and the behavioural attitude of farmers in application of untreated human and animal dung as manure, use of irrigation source which receives raw affluent from human or animal wastes lead to the transmission of zoonotic infection as vegetables harbour the parasites through these sources (Shrestha, 2010; Shiba, *et al.*, 2000). The contamination might have resulted from rain splashes of contaminated soil during heavy rainfall which deposit contaminated soil surface on leaves of vegetables or fallen fruits, (Agbolade, *et al.*, 2008; WHO, 1980). It is not also wrong to say that heavy wind may carry dust particles on leaves and fruits. Some of the vegetables and fruits may be eaten raw or undercooked and might cause infection and disease. This is true that the consumption of raw or undercooked vegetables and fruits play a significant role in human nutrition, especially as source of vitamins (C, A, B₆) thiamine, niacin, E), minerals and dietary fibre (Quebedeaux and Bliss, 1988; Quebedeaux and Eisa, 1990; Wargovich, 2000).

Special care must therefore be taken when introducing sanitation facilities that potentially increases contact between householders and excreta which may contain viable *Ascaris* ova. The risk of handling waste must be clearly identified and methods of reducing risk must be instituted wherever possible. This is because large number of students were found promiscuous in the farm yards using vegetations as cover during the exercise, this could be blamed on the non provision of toilet facilities by the campus management. Helminth infections are of particular concern in developing countries and many of these parasitic worms have human hosts. *Ascaris lumbricoides* is one of the most significant human pathogens in sanitary waste, particularly in developing communities. Its importance derives from the fact that it has ova which are extremely persistent in the environment outside the host. Shrestha *et al.*, (2010); Gaspard and Schwarzbrod (1995), reported that an important source of exposure for humans to *Ascaris* ova exists in regions where excreta are used as soil conditioners or fertilizers, so that both the person handling the waste and those consuming unprocessed crops grown in these soils are at risk of infection. Investigations in this study showed that in this campus, large amount of untreated human waste is discharged into the soil daily leading to the seeding of the soil with pathogenic organisms including geohelminth adult worm, eggs and larvae. Sanitation particularly, proper sewage treatment remains a major factor in poor rural farming systems of developing countries.



Adultworm of capillaria sp

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